DPD-4622-61

24 July 1961

MEMORANDUM FOR : Acting Chief, DPD-DD/P

SUBJECT : H-43B/Mi-4 Helicopter Comparison

1. There is not sufficient quantitative data available to make an accurate comparison between the Mi-4 and the Kaman H-43B. Recently, tests were conducted at the AFFTC, Edwards Air Force Base, California, on the Mi-4. Preliminary results of the handling qualities are available but no performance data have been submitted. The only significant figures presented are: empty weight - 11,311 pounds, normal gross - 15,765 pounds, and overload weight - 16,547 pounds. These payloads of 4,454 and 5,236 pounds are not given with any set of test conditions or operational limitations. They are also at variance with the data of the "Characteristics and Performance Handbook U.S.S.R. Aircraft." The data given in this official document is dated September 1957.

2. The handling data presented on the H-43B in AFFTC-TR-60-21, dated October 1960, has caused much controversy. The conflicting statements within the body of the report and the lack of inclusion of pertinent modifications made and tested prior to the report submission tend to degrade confidence in the evaluation. The report states that a major operational discrepancy is, among others, "poor flying qualities." Later in this same report, under the crew training section, the following statement is made: "The H-43B is a relatively easy airplane to fly. Pilots can be soloed in the aircraft after approximately 4 hours of transition." As with the AFFTC preliminary report of the Mi-4, no performance figures are quoted.

3. Only a limited amount of performance data is available from the Standard Aircraft Characteristics handbook. The data are not consistent in that payload capabilities vs. altitude cannot be compared with range data. The range data is presented for optimum altitudes of 5,000 and 1,000 feet. The mission altitude of 14,000 feet has no such data. The data on the H-43B is dated 12 January 1959 and on the Mi-4 is dated September 1957. These data are, no doubt, obsolete but are the best source available at this time. The comparative data are:

	H-43B	Mi-4
Basic weight	4,355	10,000
Fuel	1,020	1,900
Crew	400	400
Operating weight	5,775	12,300
Gross weight to hover at 14,000'	6,900	13,600
Useful load (above crew & fuel)	1,125	1,300
Service ceiling at this weight	21,500	22,500
Radius with 10% reserve	84	120
Hovering ceiling with 2000# payload	16,800	17,500
Maximum load	4,415	11,700

4. Phone conversation with the AFFTC pilot who has flown both evaluations, give the edge to the H-43B to perform the mission. This is due to the handling characteristics comparison. He stated that due to the design of the engine/rotor combination of the Mi-4, the pilot is forced to react to changes in flight conditions rather than have the ability to change the conditions at will. He said the Mi-4 must, in general, be operated as a fixed wing aircraft and take-offs and landings should be accomplished using a relatively large cleared area. Even at sea level conditions, take-offs and landings out of hover conditions present hazardous operational characteristics in the Mi-4. The Edwards AFB pilot did not believe the Mi-4 could safely perform any resupply missions at 14,000 feet or above.

5. Performance data received by telephone from the Engineering Branch of Edwards AFB is as follows:

(A) The H-43B at a take-off weight of 7,100# can carry 1000# of useful load 100 nautical miles, off load the cargo and return without refueling. Average cruise speed would be 98 knots. It would have a fuel loading of 1200 pounds and a crew of two. Trades in load vs. crew could be made. The H-43B could not hover out of ground effect at take-off weight and would require 490 feet of cleared area to reach 50 feet of altitude.

(B) Under the conditions of a 10°C hot day, the off load capability is reduced to 500 pounds and the cleared area requirement is increased to 620 feet.

(C) By using non-recommended rolling take-off techniques requiring a ground roll of 580 feet, the useful load could be increased to 1900 pounds on a standard day. The range would decrease to 97 miles and the helicopter could only hover at 5 feet above the ground at the off load point.

(D) If the temperature were 10°C hotter for condition C above, the payload would decrease to 850 pounds and the take-off roll increase to 750 feet.

(E) Due to the extreme nose down pitch with engine loss and unsatisfactory handling characteristics of the H-43B above 14,000 feet altitude, Edwards AFB does not recommend that such missions be attempted.

(F) Performance of the Mi-4 at 14,000 feet elevation is extremely limited. With zero usefulload, the helicopter can hover at 15 feet above the terrain. With 1,000 pounds of cargo, this hover altitude is reduced to 5 feet. With 2,000 pounds of useful load, the Mi-4 has no hover capability at 14,000 feet. An estimated take-off ground roll for this condition is 2,000 feet. The above figures include a crew of two and a radius of action of 80 nautical miles.

(G) Over-all, the performance of the H-43B is better than that of the Mi-4.

6. Conclusion: Due to the comments from Edwards AFB concerning the vehicle handling characteristics, it is concluded that the H-43B would not present a favorable impression in attempting to perform the resupply mission in the altitude range of 14,000 to 18,000 feet.

7. Recommendation: That the H-43B not be considered for performing resupply missions at altitudes of 12,000 feet or above.

25X1A

[redacted]

Distribution:
O&1-ACH/DPD
1-CH/DB/DPD
1-CH/AFB/DPD
1-MZ/BPO
1-EI/OPS/EX
1-DB/DPD
1-RI/DPD

DPD/DB/[illegible] :rew

FLIGHT REPORT

GENERAL COMMENTS

I COCKPIT EVALUATION:

East of Entry. Pilot entry was satisfactory. The leather hand grip facilitates entry without an objectional restriction. Co-pilot/Observer entry was not satisfactory, entry being made only from below through the cabin.

Seat Comfort. Satisfactory with and without chute. Seat adjustment unsatisfactory. Rudder pedal adjustment is satisfactory. Rudder trim tabs adjustment poor. An unnecessary feature in the aircraft is the extra weight carried because of the heavy construction of rudders, controls and numerous other items.

Relation of Pilot to cyclic stick, rudder pedals, collective and power controls. Satisfactory; cyclic stick, rudder and collective controls were all comfortable. Cyclic grip was twisted at too large an angle clockwise by approximately 30°. No great concern. Throttle motion, the reverse of our standards, was not objectionable; However, the collective spring lock was very objectionable in other than stabilized flight.

Flight Controls on Deck. East of Operations: Boost on: Cyclic force gradient excessive. Rudder forces too light. Trim indicators and controls: Cyclic trim - Found the lateral and longitudinal trim rate very good. Breakout force with initial control movement satisfactory. Rudder trim device a little awkward to use and rate of trim too high tending to cause overshoot. Breakout force too light with

T61-21359

a large "dead zone" about trim. Trim indicators excellent.

Suitability of Seat Belt and Shoulder Harness. Awkward to use and adjust. 1938 vintage. Long ends of seat belt tend to fall into collective control.

Window and Door Operation. Easily operated. Nothing unusual. Heavy construction and required only one hand.

Ease of Operating Brakes. Hand operated brakes did not hinder operation.

Cabin and Windshield Defrosting. Provided, but not evaluated.

Ease of reading instructions for actuation of emergency controls, auxiliary systems, circuit breakers, etc. Below our standards. The fire extinguisher system being provided for a single engine recip. is good. Too many pilot motions required to operate it if proper circuit breaker is not set. With tight shoulder straps, fire button could not be reached. Auxiliary Servo switches unsatisfactory as placement required crewmen to turn off primary servo. Cowl flaps, etc. on pilot's left side excellent. Cowl flap switches on center console were not necessary. Circuit breakers satisfactory. Battery generator, etc. should be more closely situated to the pilot. Consider the light up warning panel very good and of the proper size. Present U. S. warning panels are too small in size.

Emergency Escape Provision. Pilot - satisfactory. Co-pilot - unsatisfactory in that he must jump down from the cockpit or go through the cabin. Crew and passengers limited to escape through the small windows in the cabin or the one rear door.

Instrument Panels and Consoles. Satisfactory. Engine pressure and temperature instruments on the side of the Observer eliminates the large size instrument panel we are now forced to go to because of duplication. Ease of opening panel for repair by removing one nut is excellent. Location of starting switches and others needed during start are excellent. Panel and console are not outstanding, but adequate for mission.

Electronics System. Helmet and microphone are WW II type equipment; limited channel VHF. Intercom - unsatisfactory. Radio altimeter - excellent response. ADF not installed.

FLIGHT PHASE

STARTING CHARACTERISTICS:

With the exception of long list of circuit breakers the starting system is relatively simple. The need to move the blades to the forward stop delays starting and the windmilling of the rotor plus pre-oiling the transmission are two undesirable features. Shipboard operations must be restrictive! The external power source and the ability to start the aircraft by hand crank in the event of electrical trouble are desirable features for field use considering the mission. Warm up time of 10 minutes at approximately 80°F is excessive. The lack of an oil hopper is a poor feature. Oil dilution and cold engine starts will complicate starting and restrict aircraft operationally. Oil temperature gage behind pilot is poor. Rotor engagement is similar to the systems used in U. S. jaw friction clutches. The four-position

selector and push button are satisfactory, requiring approximately 3 minutes to engage. Aircraft rocks excessively on engagement and throttle restrictions are poor during step #1 & 2 of engagement. Timing each step is also poor, indicating heat or friction clutch problems. The jaw phase #3 is satisfactory and the clutch oil pressure gage is a good indication to the pilot of positive jaw engagement. The 30 second period at 600 - 800 RPM is very poor since the engine is near idle and the aircraft rocks. During step #4 of the clutch engagement, the pilot could very easily forget to push the button to release friction. There is not any indication of friction engagement the time the button is pushed.

With warm engine, start and engagement can be made within 5 minutes. Without warmup at 75 - 80°F total time to 1800 RPM for start and engagement averages 13 to 19 minutes. Strap-in time is 3 to 5 minutes since seat belts are poorly designed.

TAXI CHARACTERISTICS:

The aircraft taxi characteristics are very good. Approximately 1 indication of forward trim from start trim is required at 2200 RPM, 5° collective pitch, and 22 - 23 in MAP. The aircraft turns well about one wheel and taxis backward without difficulty. The hand brake worked well; however, taxiing aboard ship would be restricted without differential brakes. Brake responce excellent with proper sensitivity. Only rudders and collective are required for taxiing turns. Ground resonance above 2200 RPM was not apparent. Noise

level in the cockpit during taxi with doors open was high. With pilot doors closed, it was satisfactory.

TAKEOFF AND HOVER:

Pre-takeoff check-off list was small. Trim tabs had to be changed from starting position of R - 0°, A - 0°, and E - 1° aft to R - 1°R, A - 1°R, and Longitudinal - 1° Fwd. (Book figures). However, I found it necessary to use R - 2 to 2½° R, A - 3/4°.R, E - 0°.

It is interesting to note that the aircraft cockpit is not equipped with any check-off lists. When applying collective with full throttle approximately 7 to 10 seconds was required to apply collective in order to obtain maximum RPM in a hover of 2500 RPM. Trim change forces are very high unless trim is used. The trim device handles it well and elevator trim indicator presents the pilot with a good indication of cg and rudder trim of the rudder remaining.

Hover stability appears good since minimum cyclic motion is required to hold a spot. High stick forces increase pilot effort over that really necessary. Directional control power is very weak and is felt to be restrictive. Full directional control was applied many times. Outside observers report a large tail boon flexing when rudder is applied. Turns on the spot were restricted below desired for the size and mission because of the lack of rudder.

Take-off at 15,800 lbs and density altitude flown required IGE technique time to accelerate to climb speed was excessive with main concentration on rotor/engine RPM to prevent any drop or loss of RPM.

To hold altitude in a hover at a constant RPM required an awkward and tiring motion and grip to the pilot's hand on the collective. The plunger lock on the collective hindered operation during hover and take-off. Field of view over the nose and to the right of the pilot was very restrictive. With the cockpit doors closed, field of view was below safety standards and would hinder formation flight. In any banked turns over 10°, the pilot could not see the horizon in the direction of the turn.

IN-FLIGHT CHARACTERISTICS

Power adjustment from an operational viewpoint was satisfactory in level flight. Trimmability was acceptable, however, not approaching that of a fixed wing aircraft. The pitch change with speed in level flight is very small and will aid in instrument flight. Control harmony is poor. Weak rudder forces, high cyclic forces and lateral trim change with speed are below U. S. aircraft. The stable rotor system and apparent short period damping make the aircraft less fatiguing to fly in turbulent air. Conversation with H-34 indicated he was having a rough ride whereas the test aircraft required only longitudinal inputs of a smaller amount (inputs per time period) to dampen long period oscillations. Since roll is adversely coupled with pitch, more inputs lateral were required. Directional axis

was of no concern with rudders remaining near neutral in forward level flight at all speeds above approximately 25 - 30 kt

CYCLIC TRIM AIDED FLIGHT:

The near neutral longitudinal stability and flat power required curve from 40 kt IAS to 60 kt IAS required more pilot effort from a test standpoint. However, operationally flight at cruise speed could be made hands off for long periods of time within more restriction airspeed, attitude changes than present helicopters except those equipped with automatic stability or the HU-1A.

Noise level and vibration were satisfactory in cruise with and without doors open. Buffet and tail kicks were not observed by the pilot.

Transition to descent presented an unusual trim change. With reduction in power, the nose attitude would remain essentially the same. However, the airspeed would increase rapidly and required a nose high descent to obtain the trim speed for level flight again. Operations from mountains or altitude will be hindered since limit is easily exceeded. Descents also require a large directional control trim change leaving very little left rudder remaining.

LANDINGS AND APPROACHES TO LANDINGS:

Tactically, the test aircraft is more restrictive during approach than the U. S. aircraft of similar mission. At high gross weights

the right rudder required during approach to hover is excessive and at many times full control was used.

Roll on landings were acceptable below 20 kt with nose wheel shimmy above that speed. Vertical touchdowns were satisfactory. Tail low hover prohibited quick stops in addition to the power/collective synchronisation lag.

I STABILITY

1. There is an improvement in the stability characteristics over comparable single rotor helicopters without ASE. Believed to be due, in part, to the:

(a) extreme flexibility of the rotor blades giving the effect of a more outboard flapping hinge.

(b) -3 arrangement giving a direct kinematic linkage such that the pitch on an upward flapping blade is reduced resulting in a resistance of the rotor to change (i.e., gusts, etc.).

(c) linkage between horizontal stabilizer and collective pitch control.

2. Static stability tests resulted in:

(a) Stable directional gradient at 33, 66, 83.5 kt IAS.

(b) Positive dihedral effect at 33, 66, 83.5 kt IAS.

(c) Stable longitudinal gradient at 66 and 83 kt IAS; neutral to negative gradient at 33 kt IAS.

3. Dynamic maneuvers determined the following:

(a) Slowly divergent phugoid about trim speeds of 49.5 kt and 63 kt IAS.

(1) Time for one cycle, approximately 20 sec.

(2) Pitch-roll coupling - appears roll will diverge at a faster rate than pitch.

(b) Longitudinal step inputs.

(1) 1" aft input meets specification MIL-H-8501 in that "time history of normal acceleration becomes concave downward within 2 sec." about all speeds tested.

(c) Longitudinal pulse inputs:

(1) Good short period damping.

(2) Induce long period phugoid.

(d) Directional damping (establish sideslip and neutralize pedals) about 60 kt IAS in moderately gusty air.

(1) Dampens to half amplitude in approximately 3 sec.

(2) Time for cycle. approximately 4 sec.

(3) Undamped residual oscillations of approximately 5° total amplitude.

(4) Limited tests indicate possible long period phugoid type of oscillations about which this short period "fish tailing" is oscillating (estimate approximately 25 sec for half cycle, and maximum initial half amplitude approximately 6° left sideslip regardless of direction of initial displacement). NOTE: 3 & 4 possibly due to turbulent air.

(e) Lateral pulse inputs.

(1) Slowly divergent oscillations as indicated by AF.

II CONTROL

1. Control positions and throws are comfortable.

(a) Longitudinal and lateral force gradients are higher than desired.

(b) Directional control gradients are light in comparison.

(c) Total control throws (from handbook) are as follows:

Directional: 7.6 in

Longitudinal: 7.8 in

Lateral: 6.0 in

2. Control motion (Variation, with trim airspeed).

(a) Flat longitudinal control motion.

(b) Lateral control motion is considerable.

(1) Lateral control moves from 45% FF left at 40 kt IAS to 34% FFL at 70 kt IAS.

(c) Rudder pedals in approx. mid position from 30 kt IAS to 90 kt IAS.

(d) Right rudder could become critical in a hover.

3. Trim rates and operation have desirable characteristics. Approximate rates are as follows:

(a) Longitudinal: 3.9#/Sec.

(b) Lateral: 3.3#/Sec.

(c) Directional: 9.3#/Sec.

4. Control power is adequate.

5. Collective/throttle operation:

(a) Synchronization is excellent. Throttle need not be adjusted for various cp settings after it is once set (max throttle).

(b) Precise maneuvering with rapid collective displacements prohibited by lag of engine to power demand.

(c) Extended precise hovering difficult because of spring release that must be held depressed with the left thumb.

III FLYING QUALITIES - general.

1. Level flight attitudes throughout speed range.

(a) Pitch attitude change of only 3½° from 30 kt to 90 kt IAS.

2. Excessive handbook limitations on directional maneuvers in hover (crosswind, turns, etc.)

3. Vibration acceptable, worse in transition to hover.

4. Comfortable cockpit with ample room and comfortable seat.

5. Trim indicators are desirable and good CG check.

6. Holds airspeed well (over 40 kt IAS) for a helo in operational use.

7. Slight lag in response about all three axis.

8. Inadequate field of view.

9. Fuel tank aft - CG moves forward as fuel is burned (1 inch CG travel for 185# of fuel at normal takeoff gross weight).

10. Control effectiveness (longitudinal) weaker than desirable.

IV PERFORMANCE

1. Appears to have flat power required curve.

2. V_{max} not limited by power available. With a rotor system capable of higher stresses, V_{max} would be considerably higher.

3. Hover computer appears reasonably accurate.

4. Weight empty: 11,311#.

Normal gross weight: 15,765#.

Overload gross weight: 16,647#.

Diameter of main rotor: 69'.

Maximum power: 1700 BHP @ 2600 RPM.

(a) Ratio of payload to total weight is below comparable American machines.

(b) Power loading: 9.28#/HP (Comparable to American).

(c) Disc loading: 4.22#/ft^2 (Less than most American).

5. Forward tilt of main rotor mast (5°) improves parasite drag and, therefore, allows for a reduction in power.

V MAIN ROTOR SYSTEM

1. Delta - 3 hinge.
2. Flexibility of blades.
3. Mast tilt.
4. Friction lead-log dampers.
5. Hunting hinge outboard.
6. Flapping hinge close to center of hub.
7. Rotor hub has a built-in precision for each blade.
8. Blades (fabric covered) incorporate twist and taper.

VI In general, the following are considered advantages of the test helicopter under operational conditions:

1. Not fatiguing.

(a) CP/throttle synchronization during cruise flight.

(b) Seat and cockpit.

2. Reasonable platform for instrument flying.

(a) Less instability than comparable helicopters without ASE.

(b) Level attitude 3½°, 30 kt - 90 kt IAS.

(c) Static stability (directional, lateral & longitudinal above approximately 40 kt).

(d) Good short period damping.

(e) Pedals neutral throughout speed range (30 kt - V_{max}).

(f) Holds airspeed well (for a helicopter) over 40 kt.

3. Radio altimeter. Good response and needle stabilized over all types.

4. Good stability in a hover.

5. Trim system.

(a) Trim rates and operation.

(b) Indicators - check on CG.

6. Flat power required curve.

7. Spark plugs good for life of engine.

8. Signal flares controlled from cockpit. (Other usages for system).

9. Grounding wire for sling loads.

10. Accessible instrument panel.

11. Ice prevention.

(a) MRB ice detection.

(b) MRB & TRB de-icing.

(c) Windshield anti-ice & de-ice systems.

12. Armament capability.

13. Fuel boost pump.

(a) Field refueling.

(b) Internal auxiliary fuel.

14. Rear loading.

15. Computer.

16. Overall vibration level.

VII The following disadvantages were noted:

1. Pitch-roll coupling.

   (a) Lateral control motion with change-trim airspeed.

2. Critical right rudder in hover.

   (a) Sidewind and downwind hover.

3. Trim change in transition to and from a hover.

4. Limited maneuvering (throttle/CP synchronization).

5. Starter hang-up.

6. Collective fatiguing in hover (release button) at critical gross weights.

7. Lengthy warm-up (70° - 80°F OAT).

   (a) 10 min - oil warmup.

   (b) 3 min - engagement.

   (c) 3 - 5 min - launch.

8. Handbooks poorly written.

9. Fueling (location of fuel port).

10. Big size.

11. 6' 4" clearance of tail rotor (approx.).

12. Engine maintenance accessibility.

13. Tow bar arrangement.

14. Heavy transmission, head and in-mast construction.

15. Much bonding wire required. (However, this may be required for radio altimeter.)

16. V_{max} limited by structural considerations.

17. Overall cockpit field of view.

HELICOPTER PERFORMANCE SLIDE RULE

A computer was constructed on vellum identical to the subject slide rule with the necessary changes to "conventional" scales (meters to feet; Kg to lbs; etc.). The appropriate conversions were provided in the modifications. An enclosure is provided showing the four faces of the slide rule. A&C are attached, with B free to slide between. A movable hairline is provided as in a conventional slide rule. The reverse side provides E sliding between D&F.

The hover computer (A, B & C) provides a very good and easy method of computing maximum gross weight for hovering out of ground effects, and the maximum gross weight at which the helicopter can successfully be taken off, (or maximum gross weight for in ground effect hovering). The data used are the ambient conditions under which the helicopter will be operated. The computer is small (fits in the pocket of a flight suit) and appears to be fairly accurate.

It is believed that various restrictions of the aircraft are included on the table on the left side of A, B & C. To determine the maximum takeoff gross weight, the movable cross hair is placed at the intersection of the ambient pressure altitude and outside air temperature. The center slide (B) is then moved so that the appropriate wind (top scale) is under the cross hair. It then is an easy matter to look over the proper specific humidity and read the maximum gross weight for

takeoff. Because wind effect varies IGE & OGE, the bottom of scale B and scale C are used for maximum hovering OGE gross weight. The method of calculation is the same, however. By being able to simply calculate maximum weights with one motion, the A, B & C side of the slide rule demonstrates a very ingenious and well-designed innovation.

Test instrumentation and necessary ballast installations necessitated a high minimum weight restriction. This restriction and the high density attitude at the test site prohibited OGE hovering, so the OGE performance data could not be properly checked. At a gross weight of approximately 14,700#, hovering OGE was not possible at the test site. The computer, figured for the ambient conditions during the tests, provided the maximum gross weight for OGE hovering to be 14,100# to 14,200#. It was apparent during the test that the helicopter could "almost" hover OGE.

Normal gross weight (approximately 15,800#) takeoffs were conducted on numerous occasions. When ambient conditions indicated on the slide rule a maximum gross weight takeoff, the opinion of the pilot verified the observation.

The reverse side (D, E & F) was not checked and therefore no comment is made. Difficulties in translation and interpretation present difficulties in understanding the intent. The proper scales and factors are presented, however, for further study. It is believed

that the D, E & F side is utilized for determination of optimum range and endurance flying.

It is believed that a similar slide rule could be improved upon and beneficially utilized by operators of present American helicopters.

QUALITATIVE EVALUATION OF THE PBZ-2 RADIO ALTIMETER

During normal tests of the H-3[illegible] aircraft, operation of the PBZ-2 altimeter indicated that the instrument responded correctly to terrain height variation in level flight, turns and longitudinal pitch changes. The instrument needle responded immediately to aircraft altitude changes and could be read accurately to 1 meter (3.28 ft). The needle was well dampened.

With the altimeter installed in the [illegible], response and stability of the instrument remained the same. The calibration of the instrument had changed and some random fluctuations, similar to stray voltage inputs, were noticeable.

Tests involved flights over the dry lake bed, farm fields, rolling hills, buildings and mountainous terrain when enroute to Pt. Mugu. The instrument responded in the proper direction from 30 meters to 900 meters above the terrain. At Pt. Mugu, flights over water, beach, swamps, runways and roads were conducted from 5 meters to 30 meters at V_o from 5 kts to 85 kts. Flight paths were at intersection angles from water to shore at 90° - 45° and 15°. Sideward flight at 5 kts from the water to shore was made in addition to turns up to 35° bank angle with ASW approaches to hover and forward flight over water.

In all cases the instrument responded properly to all altitude changes, and was very steady. Variation in aircraft pitch attitude

up to 15° nose high and roll to 35° did not reveal any change in altitude indications over water or land. A few random oscillations, believed caused by some stray voltage incurred with reinstallation in the H-34, were noticed. When flying over a high voltage power line a large deflection of the needle - from 5 to 35 meters, occurred.

Breakdown of the needle with a rapid rise from 15 to 50 meters occurred over the lake bed in an extreme nose high flare of approximately 25° to 30°. This maneuver was extreme, however.

CONCLUSIONS:

1. The instrument is very steady with accurate response changes at the time the aircraft passes over the obstacle.
2. Altitude indication is held throughout all normal maneuvers over all types of terrain and water to shore.

RECOMMENDATIONS:

1. It is recommended that the entire installation and instructions be sent to the Naval Air Development Center, Johnsville, Pa. for evaluation.

NOTE: The stray voltage inputs observed with the altimeter installed in the H-34, that were not noticed in the H-36, may be one of the reasons why the H-36 has all the bonding wire installed.

Office Memorandum • UNITED STATES GOVERNMENT

MEMO NO. 16-61

25X1A

TO : DPD/DB ATTN: [redacted]

DATE: 14 July 1961

25X1A

FROM : EE/OPS/EX - [redacted]

SUBJECT: Flight Report on the H-36 Helicopter

The attached is forwarded in accordance with your request and may be retained by you. Please note that it was received unofficially from AFSC. The final report is in process of review prior to publication, and we are promised a copy by the Air Force when it is published. If you are interested, we will make the final report available to you.

Approved For Release 2000/05/16 : CIA-RDP81B00880R000100110002-9